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| SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402 | | | PATEL, SHEFALI D | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/669,395

Applicant(s)

ARGIRO ET AL.

Examiner

Shefali D Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 8, 10-14, 28-32, 34, 35 and 37-41 is/are rejected.
- 7) ☒ Claim(s) 15-27, 42-54 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The amendment was received on February 03, 2004.
2. Amendments to the specification and the claims have been entered.
3. Claims 6, 9, 33, and 36 have been cancelled without prejudice.

Response to Arguments

1. Applicant's arguments filed on January 26, 2004 regarding claims 1-9 and 28-36 have been fully considered but they are not persuasive. With regards to claims 1 and 28, applicant argue on page 13 that "Brightness is a level of pixel intensity and does not have anything to do with whether an image is blurry or not. As a result, brightness and blurriness are not the same, and Sheehan does not reach or disclose the recited language." Regarding claim 7, applicant argue on page 14 that « no where in the cited language or elsewhere in Sheehan is it taught or disclosed that FT is used to determine blurriness." Please note that according to www.dictionary.com, the definition of the word "brightness" is "the dimension of a color that represents its similarity to one of a series of achromatic colors ranging from **very dim (dark)** to very bright (dazzling)." Note that when the brightness is very dim, it is viewed as blurry. Dim is a synonym for Blur.
2. Applicant's arguments, see remarks (pages 14-16), filed on January 26, 2004, with respect to the rejection(s) of claim(s) 10-14 and 37-41 under 35 U.S.C. 102b and 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

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However, upon further consideration, a new ground(s) of rejection is made in view of Heuscher et al. (US 6,510,337 B1).

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 7-8, 28-29, and 34-35 are rejected under 35 U.S.C. 102(b) as being anticipate by Sheehan et al. (USPN 5,533,085).

With regard to **claim 1**, Sheehan et al. (hereinafter, “Sheehan”) discloses a method for selecting images of a portion of a cardiovascular system (Note, Sheehan discloses an angiograph system where cardiac cycles are obtain. According to the Merriam-Webster’s Dictionary®, both angiography and cardiovascular is an analysis of the blood vessels.) comprising: receiving from an image scanner a plurality of images recorded over a period of time (see for example, col. 5 lines 47-62, where Sheehan discloses a detector 30 in which image intensifier 32 and video camera 38 is included to record images over a period of time, also shown in Fig. 1.), the images representing one or more location along the extent of the cardiovascular system (col. 7 lines 17-18 where different viewing angles of the heart is being monitored); and selecting at least a subset of the images based on common criteria determined from the plurality of images (at col. 7 lines 15-17, Sheehan states: “it should be noted that the software can be used to select images occurring either before or after end systole and end diastole and that the term “specific image” as used in this specification and in the claims that follow is intended to encompass any image

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referenced by *predefined criteria* (emphasis added by the examiner) relating to portions of the cardiac cycle.” What this means is that, Sheehan selects any image, which obviously includes portion of the images, according to a predetermined criteria; and further more Sheehan does select the subset of the image, see the description made at col. 8 lines 3-5 and col. 9 lines 28-34. The frames are being selected for end systole and end diastole and without reference to an external signal (it is clearly noted at col. 7 lines 19-25 that a reference to an external signal is not made as Sheehan uses a medical practitioner instead of an EKG monitor.).

With regard to **claim 2**, Sheehan discloses the method of claim 1, wherein the portion of the cardiovascular system is the heart (See col. 5 lines 33-34).

With regard to **claim 7** Sheehan discloses a method wherein the blurriness of the image is determined by a Fourier transform (hereinafter, “FT”) applied to the image. Sheehan applies FT to the image (See col. 14 lines 58-63). The blurriness of the image is obtained from here because Sheehan states: “The exact total edge length in the block can be estimated by summing all of the frequency components for the block.” As mentioned before in claim 1, the total edge length is used in selecting a subset of the image.

With regard to **claim 8** Sheehan discloses a method wherein the blurriness is determined by the mean pixel difference between the image and an adjacent image. Sheehan first obtains the difference between the pixels within the row and a column of the image (see for example, col. 11 lines 22-30) and then repeats this process for each frame (See col. 14 lines 40-45). Thus, Sheehan teach finding a difference between the image and the adjacent image.

Claim 28 recites identical features as claim 1 except claim 28 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 1 is equally applicable

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to claim 28. Sheehan discloses computer-readable medium (See col. 6 lines 40-67, also shown in Fig. 1).

Claim 29 recites identical features as claim 2 except claim 29 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 2 is equally applicable to claim 29.

Claim 34 recites identical features as claim 7 except claim 34 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 7 is equally applicable to claim 34.

Claim 35 recites identical features as claim 8 except claim 35 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 8 is equally applicable to claim 35.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 10-13 and 37-40 are rejected under 35 U.S.C. 102(e) as being anticipated by Heuscher et al. (US 6,510,337) (hereinafter, "Heuscher").

With regard to **claim 10** Heuscher discloses a cardiovascular system comprising: receiving from an image scanner (CT scanner 10, col. 3 line 3) a plurality of image recorded over a period of time (See, col. 3 lines 49-57 and col. 4 lines 1-7), the images representing one or

more locations along the extent of the cardiovascular system (the radiation detectors 40 around the periphery of the examination region 14 to capture images from more than one location of the patient 32 as seen in Figure 1 and at col. 3 lines 23-35); deriving a cardiac cycle signal from the plurality of scanned images (the data acquired by the CT scanner 10 are processed by an image processor 50 and generates images (“preferable, of the patient’s heart and/or surrounding anatomy”) from the views or data lines and this information is being further processed by video processor 54 and send to display 56 for human-viewable format, See col. 4 lines 8-29. The ECG monitor also acquires EDG data from the patient 32 as seen in Fig. 1 and at col. 4 lines 29-34. See Figure 2 for a cardiac cycle signal from times t1 through t4, col. 4 lines 34-44); and assigning a phase in the cardiac cycle to each scanned image (times t1 through t4 correspond to and assigns a phase in the cycle to each part of the image at col. 4 lines 45-67 to col. 5 lines 1-4).

With regard to **claim 11**, Heuscher discloses the method of claim 10, wherein the portion of the cardiovascular system is the heart (See col. 4 lines 15-17).

With regard to **claim 12** Heuscher discloses the method of claim 10, wherein the image scanner is a CT scanner (col. 3 line 3).

With regard to **claim 13** Heuscher discloses the method of claim 10, wherein the image scanner is a MRI scanner (See, col. 1 lines 8-15).

Claim 37 recites identical features as claim 10 except claim 37 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 10 is equally applicable to claim 37. Heuscher discloses computer-readable medium as seen in Fig. 1.

Claim 38 recites identical features as claim 11 except claim 38 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 11 is equally applicable to claim 38.

Claim 39 recites identical features as claim 12 except claim 39 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 12 is equally applicable to claim 39.

Claim 40 recites identical features as claim 13 except claim 40 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 13 is equally applicable to claim 40.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3-4 and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheehan in view of Heuscher.

With regard to **claim 3**, Sheehan discloses all of the subject matter recited in claim 1 as already discussed above in paragraph 2 and the arguments are not repeated herein, but are incorporated by reference. Sheehan does not expressly disclose image scanner being a CT scanner. However, Heuscher discloses the image scanner being a CT scanner 10 at col. 3 line 3 and in Figure 1. Sheehan and Heuscher are combinable because they are from the same field of

endeavor, i.e., medical imaging. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Heuscher with Sheehan. The motivation for doing so is to allow acquiring the images as suggested by Heuscher with the advantages of identifying a cardiac phase for a patient more accurately and reliable where a particular phase of the heart might be studied more closely for a certain abnormality at col. 8 lines 22-27. Therefore, it would have been obvious to combine Heuscher with Sheehan to obtain the invention as specified in claim 3.

With regard to **claim 4** Heuscher discloses the image scanner is a MRI scanner (See, col. 1 lines 8-15).

Claim 30 recites identical features as claim 3 except claim 30 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 3 is equally applicable to claim 30.

Claim 31 recites identical features as claim 4 except claim 31 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 4 is equally applicable to claim 31.

7. Claims 5 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheehan in view of Hunziker (US 5,910,111).

With regard to **claim 5** Sheehan discloses all of the subject matter recited in claim 1 as already discussed above in paragraph 2 and the arguments are not repeated herein, but are incorporated by reference. However, Sheehan does not expressly disclose the image scanner being an ultrasound scanner. It would have been obvious matter of design choice to modify the

Sheehan reference by having ultrasound scanner since applicant has not discloses that having an ultrasound scanner solves any stated problem or is for any particular purpose and it appears that the ultrasound scanner would perform equally well with the image detector (as disclosed in Sheehan and claim 1 above).

Please note that Hunziker discloses ultrasound scanner as the image scanner at col. 2 lines 62-66. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Hunziker with Sheehan. The motivation for doing so is to allow acquiring the heart motion image data as suggested by Hunziker at col. 2 lines 63-66. Therefore, it would have been obvious to combine Hunziker with Sheehan to obtain the invention as specified in claim 5.

Claim 31 recites identical features as claim 5 except claim 32 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 5 is equally applicable to claim 32.

8. Claims 14 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heuscher in view of Hunziker (US 5,910,111).

With regard to **claim 14** Heuscher discloses all of the subject matter recited in claim 10 as already discussed above in paragraph 4 and the arguments are not repeated herein, but are incorporated by reference. However, Heuscher does not expressly disclose the image scanner being an ultrasound scanner. It would have been obvious matter of design choice to modify the Heuscher reference by having ultrasound scanner since applicant has not discloses that having an ultrasound scanner solves any stated problem or is for any particular purpose and it appears that

the ultrasound scanner would perform equally well with the image detector (as disclosed in Heuscher and claim 10 above).

Please note that Hunziker discloses ultrasound scanner as the image scanner at col. 2 lines 62-66. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Hunziker with Heuscher. The motivation for doing so is to allow acquiring the heart motion image data as suggested by Hunziker at col. 2 lines 63-66. Therefore, it would have been obvious to combine Hunziker with Heuscher to obtain the invention as specified in claim 14.

Claim 41 recites identical features as claim 14 except claim 41 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 14 is equally applicable to claim 41.

Allowable Subject Matter

9. Claims 15-27 and 42-54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The closest prior art Sheehan and Heuscher directed to a method for selecting/ordering a plurality of images of a portion of a cardiovascular system comprising deriving the cardiac signal. However, Sheehan says nothing about segmenting a set of data in each image to derive the cardiac signal. While the reference to Ben-Haim (US 2002/0165448) describes plurality of signals corresponding to drive signals (See page 6 paragraph 120), an ordinary artisan would not be motivated to combine Ben-Haim with Sheehan because Ben-Haim as well does not use

segmentation to derive the signal. Neither Sheehan nor Ben-Haim applies the claimed computation of a change value in the image by segmenting a set of data in each image for deriving the cardiac signal. These features in combination with all of the other elements of the claims are not disclosed or fairly suggested by the closest prior art of Sheehan and would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 42-54 recites identical features as claims 15-27 except claims 42-54 are a computer-readable medium claim. Thus, arguments similar to that presented above for claims 15-27 are equally applicable to claim 42-54. Thus, they are allowable for the same reasons.

Conclusion


10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 4,547,892; US 5,781,010; US 4,788,975.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shefali D Patel whose telephone number is 703-306-4182. The examiner can normally be reached on M-F 8:00am - 5:00pm (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


DANIEL MARIAM
PRIMARY EXAMINER

April 21, 2004

Shefali D Patel
Examiner
Art Unit 2621